

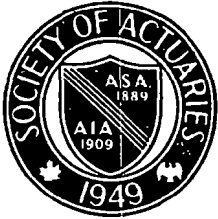


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## ON LEVEL PREMIUM POLICY LOSS RATIOS

by Clayton A. Cardinal

With the recent increases in frequency and severity rates in health insurance, many insurers have filed or are filing premium increases on their individual policies. Understanding the need for a premium increase on guaranteed renewable level premium policies is difficult for many regulators because of the "confusion" caused by the active life policy reserve. The purpose of this essay is to present a perspective on loss ratios for level premium policies which may be helpful to an insurer in reflecting a regulator's or consumer's viewpoint.

Three classes of loss ratios may be established, which when taken in a predetermined order constitute an important pattern. This pattern can be used to explain the need for a premium increase and also to demonstrate that the amount of any increase is not excessive.

### First Class

Past premiums through any point of time on any increasing risk level premium contract must be sufficient to fund benefits incurred since inception and also to fund the policy reserve resulting from the level premium funding mechanism. Said differently, since the policy reserve is an estimation of the excess of the present value of future benefits over that of the future funding for future benefits, it follows that the policy reserve must be added to the present value of past benefits when relating (1) the total funds set aside for benefits (past and future) out of past premiums to (2) the past premiums. Accordingly, the first class of ratios represents the relationship between (1) the present value of the sum of past benefits and the present policy reserve (here, and elsewhere, adjusted to net level premi-

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## C A P S A

M. D. R. Brown  
and  
K. H. Cooper

The first public conference of the Canadian Association of Pension Supervisory Authorities was held in Quebec, June 11-12, 1975. The Association is composed of representatives of government bodies which administer legislation governing private pension plans in Canada. To date, this legislation operates in four provinces and for certain plans under federal jurisdiction. Similar legislation will come into effect, probably in 1976, in three other provinces.

The organizers of the conference solicited submissions from employer and labour groups and professional and trade organizations. The fourteen briefs submitted were the basis for discussions at the conference. Each session dealt with a particular aspect of pension benefits legislation, and was presided over by the senior person responsible for pension regulation in one of the jurisdictions.

The topics discussed covered a wide range: the need for stricter standards of mandatory vesting and/or locking-in of employee contributions (the present minimum standard is age 45 and 10 years' service); the need for greater public awareness and understanding of existing legislation; pressure for more disclosure in the areas of financing and administration (Canadian legislation lags far behind the U.S. here, though far in advance in other respects); the impact on pension benefits legislation of the growing thrust of "Human Rights" (anti-discrimination) legislation; and the concerns of legislators in the investment area, including the fiduciary responsibility of various parties and the need for professional standards of conduct, among pension fund investment managers.

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## ADVISORY COUNCIL ON SOCIAL SECURITY

Reports of the Quadrennial Advisory Council on Social Security, pp. 239, Superintendent of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402, \$1.95.

by K. Arne Eide

Gigantic size and awesome complexity are two of the characteristics that impress most people who study the social security system in the United States. To analyze its many programs and emerge with a clear conception of the system's intricately interwoven structure and multitudinous operations is not an easy mental exercise. Even when consideration is restricted to the old-age, survivors, disability, and health insurance (OASDHI) programs which commonly, but mistakenly, are thought to constitute the social security system, the task of analyzing the programs is a formidable one. Yet making such analyses and coming up with recommendations for improvement in the programs was the assignment of the 1975 Advisory Council on Social Security. All in all, this reader of the Reports believes the Council completed its assignment in a most commendable manner.

The statutory authority for the Advisory Council states that it shall be appointed "for the purpose of reviewing the status of the Federal Old-Age and Survivors Insurance Trust Fund, the Federal Disability Insurance Trust Fund, the Federal Hospital Insurance Trust Fund and the Federal Supplementary Medical Insurance Trust Fund in relation to the long-term commitments of the old-age, survivors, and disability insurance program and the programs under parts A & B of Title XVIII, and of reviewing the scope of coverage and the adequacy of benefits under, and all other aspects of, these programs, including

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## Level Premium Ratios

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um if not valued already as such) and (2) the present value of past premiums.

### Second Class

Past premiums and future premiums at any point of time on any increasing risk level premium contract must be sufficient to fund both benefits incurred from inception to that point of time and benefits to be incurred after that point of time. Said differently, past and future benefits must relate to past and future premiums. Accordingly, the second class of ratios represents the relationship between (1) the present value of the sum of past benefits and future benefits and (2) the present value of the sum of past premiums and future premiums.

### Third Class

Future premiums after any point of time on any increasing risk level premium contract must be sufficient to fund any excess of the future benefits over the policy reserve at that point of time. Said differently, since the policy reserve is set aside for future benefits it follows that that reserve must be deducted from the value of future benefits when relating the future benefits to the future premiums. Accordingly, the third class of ratios represents the relationship between (1) the present value of the excess of future benefits over the policy reserve and (2) the present value of future premiums.

If past experience has followed initial expectation, if future experience also follows initial expectation, and if the policy reserve represents a reasonable value of the fund accumulation, the three classes of ratios would be expected to have identical values. However, since each of these conditions cannot be exactly met, the ratios for each of the three classes cannot be identical and the pattern of their relationship may be examined in order to detect pricing anomalies. What patterns are possible and what do they mean?

A decreasing pattern of ratios indicates that future premiums *in relationship to* past premiums can be expected to be excessive. An increasing pattern indicates that future premiums *in relationship to* past premiums can be expect-

ed to be deficient. A level pattern indicates that future premiums *in relationship to* past premiums can be expected to be neither excessive nor deficient. A bell- or U-shaped pattern indicates among other things the policy reserve is not representative of the value of the fund which should have been accumulated.

### Illustration

As an illustration of the perspective herein presented, values for the three classes of loss ratios from a recent premium increase filing on a major medical policy issued between March 1970 and March 1972 by the author's company are set forth below. Total premiums involved (past and future) were expected to be about \$10,000,000. In determining the ratios, the present values were developed for two sets of interest rate assumptions. First, an interest rate of  $i=0$  for all years was used because the resulting values were consistent with that which has been intended by the NAIC in the calculation of the so-called 50% benchmark. Second, an interest rate of 6% graded both before 1970 and after 1970 was used as representing approximately the company's past and future expected investment performance.

Future expected benefits were based on realistic morbidity, persistency, select to ultimate, and secular trend (through 1977 only) assumptions. Future expected premiums were based first on the then current table of premiums and then on the revised table (which represented a 32% increase), and reflected the persistency assumptions used in the benefit projections.

Ratio Class	Loss Ratio, by Premium Table			
	Current		Revised	
	$i=0$	$i=.06$	$i=0$	$i=.06$
1st	.58	.54	.58	.54
2nd	.68	.60	.59	.54
3rd	.77	.69	.59	.53

Obviously, with increasing patterns using current premiums, future premiums without increase would be deficient. Further, the expected impact of the revised premiums on the ratios can be seen not to have been excessive, for the results conform to the sought-after level pattern. □

## Letters

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Sir:

The following comments are offered concerning Mr. Paquin's letter.

The policy reserves of GAAP statements are a unified quantity, the intermediate form of release from risk reserve, (which may be separated for presentation purposes). This view has been labeled the "unified reserve" approach and is consistent with actuarial practice over many years.

Part of the technical input to Recommendation 1 of the American Academy of Actuaries Committee on Financial Reporting Principles was Richard Horn's paper, "Life Insurance Earnings and the Release from Risk Policy Reserve System" which appears in the Transactions, Volume XXIII, page 391. This paper indicates the role of each assumption, including interest, in achieving the matching of cost and revenues (and hence, net income) as required by the Audit Guide.

Recommendation 1 and Interpretation 1-a go to considerable length outlining the factors to be taken into account in setting the actuarial assumptions for use in financial statements of stock life insurance companies prepared in accordance with generally accepted accounting principles. As stated in paragraph (1) of Recommendation 1 it "... relates to the actuarial methods and assumptions for all elements affecting costs (i.e., all benefits and all expenses, excluding any specific loading for profit) ...". Interest is an element affecting cost just as are elements such as mortality, persistency, etc. The assumptions should, among other things, "... be based on experience or estimated experience ..." (paragraph 2) and "... selected as of the acquisition date which include provisions ... for the risks of adverse deviations from most likely assumptions" (paragraph 4).

Interpretation 1-c deals with the reserve component which reflects prepaid and unamortized acquisition expenses and which because of accounting reasons, not actuarial reasons, is to be presented separately from the remainder of the reserve. This Interpretation addresses itself to the questions of *quantifying* the expense element used in determining the

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